



## **HOW SCHOOL CHOICE, AUTONOMY, AND ACCOUNTABILITY IMPACT STUDENT ACHIEVEMENT: INTERNATIONAL EVIDENCE**

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### *Introduction*

As the country profiles gathered in this volume illustrate, policies concerning choice, autonomy, and accountability in national school systems have profound implications for the degree of freedom exercised by families and by those operating schools. Yet an equally important consideration for policymakers seeking to strike the right balance in this area may be the consequences of alternative arrangements for schools' success in raising student achievement.

International evidence shows a strong positive association between the quality of schooling, as measured by student performance on achievement tests, and long-run economic growth across countries (Hanushek and Woessmann 2008, 2011).

Moreover, ample data confirms that simply investing more resources in national school systems as currently configured is unlikely to improve student achievement substantially (Hanushek and Woessmann 2011).<sup>i</sup>

The institutional environment in which schools operate, on the other hand, may make all the difference. Economic theory suggests that the performance of a given industry will reflect the incentives that actors within it face. That is, if the actors in an education system are rewarded (extrinsically or intrinsically) for producing better student performance, and if they are penalized for failing to do so, this will over time lead to superior outcomes. The incentives to produce high-quality education, in turn, are determined by the education system's institutions – the rules and regulations that set rewards and penalties for all those who are involved in the educational process and govern their ability to respond to those rewards and penalties.

Although parents' freedom to choose private schools, the autonomy of school staff to make independent decisions, and the extent of accountability in the education system have all been argued to be important for student outcomes, empirical evidence on their effects has been hard to come by. This reflects the fact that policies in these areas often do not vary within countries. For example, external exam systems, which are one mechanism to provide accountability for student outcomes, tend to be a national policy, so that they are either present in the whole country or not at all.<sup>ii</sup> Furthermore, policies such as the freedom to choose private schools may have a systemic impact, affecting not only the individual students who do so but also the performance of public schools that are exposed to greater competition.

The research reviewed in this chapter looks at a different kind of variation in the prevalence of choice, autonomy, and accountability: variation across countries. It asks, for example, whether students as a whole perform better in countries where parents have ample choice to send their children to privately operated schools. And it explores whether the answer to that question depends on the autonomy schools have to manage their own affairs and the extent to which they and their students are held accountable for their performance. To answer these questions, we draw on data from several recent international student achievement tests, which provide comparable information on student achievement for many countries. By examining data across a large sample of countries, we are able to suggest what countries can learn from each other about the effects of school choice, autonomy, and accountability on student outcomes.

## *Studying institutional effects on student achievement*

Why would we expect, from a theoretical point of view, that institutions that introduce choice, autonomy, and accountability might have an effect on student learning? The background of these considerations is that in the private business sector, market competition tends to discipline firms to work effectively because they would otherwise fail to profit. Inefficiency leads to higher costs and higher prices – practically an invitation to competitors to lure away customers.

However, countries around the world generally finance and operate the great majority of their schools publicly (Pritchett 2003). This relative lack of competition in the compulsory education sector tends to dull incentives to improve quality and restrain costs (Hanushek et al. 1994). Moreover, in the public system, the ability of parents and students to ensure that they receive a high-quality education is often constrained by obstacles to leaving bad schools.

Institutions that ensure informed choice among autonomous schools may therefore be expected to create incentives for school personnel to use their resources in ways that maximize student learning.<sup>iii</sup> The choice that different institutions can introduce is not limited to the choice for parents in terms of the availability of privately operated schools. It also includes, for example, choice for schools and teachers in the public sector to make autonomous decisions. Likewise, accountability may be aimed at schools or at students, through such institutional features as external exit examinations and regular monitoring of student progress by tests and exams.

## *Gathering evidence on the effects of institutions*

How can we test whether these hypothesized effects of competition, autonomy, and accountability prevail in the real world? And how can we determine whether these effects are large enough to warrant attention? Studying institutional effects requires variation in institutional factors that is often not present within a single country. This is most apparent in the case of system-wide central exams, which by definition are administered either for virtually all students in the system or for none. There is therefore no way to provide evidence on the effects of this institution on student achievement based on data from within a single country. Because most education policy research tends to focus on individual countries, the potentially important effects of choice and accountability tend to be missed. By contrast, the approach taken in the research reviewed in this chapter is to exploit the substantial variation in institutional arrangement that exists across countries (Hanushek and Woessmann 2011). Some countries have central exam systems, others do not. Some countries have many non-state (private) schools, others hardly any. This kind of variation is essential in order to analyze which institutional factors are associated with higher levels of student achievement.

Even so, the internationally comparative approach suffers from a number of limitations. First, the limited number of country observations that can be included in any one analysis often precludes in-depth analyses of the details of implementation which are likely to be crucial in determining a given policy's real-world impact. More importantly, there are limits to the causal interpretation of international analyses. To the extent that the international variation in institutional features is associated with other unobserved country features, the empirical associations can only provide a biased picture of the actual causal relationships. Therefore, the results reported in this chapter control in an unusually extensive form for differences in the characteristics of students, schools and countries. This approach holds numerous

variables of family background, material and personnel endowment of schools, and levels of per-capita income and educational expenditure of countries constant.

Accounting for observable influences allows a comparison of students, schools, and countries which are equivalent to one another in terms of these determinants. Still, the international student achievement tests provide observational data, in which institutional features are not divided between randomly chosen treatment and control groups. Insofar as institutional features stand in a wider cultural context and have crucial historical roots, the associations reported here will inevitably include such unobserved differences across countries and may not correspond to the direct causal effects of introducing a new institutional feature in a specific country. However, where appropriate we also discuss the results of quasi-experimental studies which support the evidence of institutional effects we observe across countries.

### *The data: international student achievement tests*

The data that enable the cross-country identification of institutional effects are international student achievement tests. These tests quantify the educational performance of students in subjects such as math, science, and reading by using the same test items in all participating countries. Thus, they provide measures of educational performance that are directly comparable across countries. Furthermore, by using representative sampling methods to draw random samples of schools, all the international student achievement tests used in this chapter provide representative samples of students in each participating country.

In particular, the research summarized in this chapter uses data from several recent international student achievement tests. The first one is the Third International Mathematics and Science Study (TIMSS), conducted in 1995 with data released in 1997. TIMSS was conducted by the International Association for the Evaluation of Educational Achievement (IEA), an independent cooperation of national research institutes and governmental research agencies. TIMSS targeted representative samples of students in the two adjacent grades with the largest share of 13-year-olds (usually 7th and 8th grade). For the analyses conducted in this chapter, TIMSS yielded internationally comparable data for 266,545 students from 6,107 schools in 39 countries (for details, see Woessmann 2003a and the references therein). Second, the IEA replicated the TIMSS test in 1999 under the name TIMSS-Repeat, with data released in 2001. TIMSS-Repeat targeted the upper of the two grades tested in TIMSS (usually the 8th grade), covering 180,544 students in 38 countries (see Woessmann 2003b and the references therein). The sample of participating countries differed considerably between the two tests, so that the pooled TIMSS/TIMSS-Repeat database contains 54 different countries (447,089 students).

Third, the Organisation for Economic Co-operation and Development (OECD) conducted the Programme for International Student Assessment (PISA) in 2000, with data released in 2002, which targeted fifteen-year-old students. The PISA 2000 database covers 175,227 students in reading (96,855 in math, 96,758 in science) in 32

countries (see Fuchs and Woessmann 2007 and the references therein). Fourth, the OECD administered a second wave of the PISA study in 2003, with data released in 2005. The PISA 2003 database covers up to 265,878 students in mathematics in 37 countries (see Woessmann, Luedemann, Schuetz, and West 2009 and the references therein). Fifth, the recent study by Hanushek, Link, and Woessmann (2011) pools the data from all four available waves of PISA tests – 2000, 2003, 2006, and 2009 – to pursue panel analyses with 1,042,995 students in 42 countries that cover 155 country-by-wave observations in mathematics (and similar samples in science and reading). Sixth, in 2001 the IEA conducted the Progress in International Reading Literacy Study (PIRLS), with data released in 2003. While the focus of the previous studies was on secondary schools, PIRLS tested the reading performance of 140,626 primary-school students in 35 countries (see Fuchs and Woessmann 2005 and the references therein). The target population of PIRLS was the upper of the two grades with the highest share of 9-year-olds of a country (usually the 4th grade).

The question addressed in the studies reviewed in this chapter is whether, on average, the countries performing better than the mean of countries on the different international tests feature an institutional set-up of their education systems that gives a bigger role to private schools, autonomy, and accountability, after holding constant other influence factors such as parental background, the development level of a country, and the mean educational expenditure per student of a country.

### *The empirical model: multiple student-level cross-country regressions*

However, the research described in this chapter does not merely compare aggregate performance levels across countries. Rather, it analyzes performance at the level of the individual student, using individual student-level data not only on educational performance in math, science, and reading, but also combining it with extensive background information on other potential influence factors. These include dozens of indicators of family background, mostly taken from student background questionnaires (and parental background questionnaires in the case of primary-school PIRLS); several indicators of the resource endowment of the specific class or school, mostly taken from teacher and school background questionnaires; and several indicators of institutional features of the school systems, mostly taken from school background questionnaires. The latter include our primary measures of the extent of choice, autonomy, and accountability in the specific school of each tested student.

Using these extensive student-level data, each of the studies discussed below estimates a variant of the following empirical model:

$$T_{isc} = B_{isc}\alpha + R_s\beta + I_s\gamma + \varepsilon_{isc}$$

In this specification,  $T_{isc}$  is the achievement test score of student  $i$  in school  $s$  in country  $c$ .  $B$  is a vector of student background data (including student characteristics,



family background and home inputs), and  $R$  is a vector of data on schools' resource endowments.  $I$  is a vector of institutional characteristics. The parameter vectors  $\alpha$ ,  $\beta$ , and  $\gamma$  are estimated in microeconomic cross-country regressions performed at the level of individual students  $i$ . Thus, sample sizes are roughly between 100,000 and 450,000 students on the different tests (see above).<sup>iv</sup>

While the  $\gamma$  coefficient estimates are our primary interest in this review, the general pattern of results on the effect of family background and resource endowments should be acknowledged. All studies confirm very strong family-background effects on educational performance, with students from better-educated families and with higher socioeconomic status performing substantially better (see, e.g., Woessmann 2003a; Fuchs and Woessmann 2005, 2007; Schuetz, Ursprung and Woessmann 2008). By contrast, most studies usually find no consistent effect of resource endowments (see, e.g., Woessmann 2002, 2005b; Woessmann and West 2006; Hanushek 2003). Students in countries with higher spending levels or smaller classes do *not* tend to perform better than students in less well equipped countries. This pattern suggests that increased financial investment in education is unlikely on its own to improve student achievement and provides additional motivation for considering the effects of institutions.

## *International evidence on institutional effects*

In this section, we review evidence from studies that have taken the approach just described to examine the effects of school choice, autonomy, and accountability on student achievement across countries, controlling for differences in family background and the level of resources devoted to education. We pay particular attention to evidence concerning how the effects of these institutions may work in complementary ways. What do studies based on international achievement tests tell us about the effects of institutional features on the quality of schooling?<sup>v</sup>

## *Competition through public funding for privately operated schools*

Privately operated schools provide choice for parents and competition for public schools, which economic theory. Standard economic models of industrial organization suggest that competition and choice create incentives that improve performance. Theoretical applications of this logic to the market for education are numerous, often with differing focuses and conflicting predictions concerning the likely consequences for the equity of student outcomes.<sup>vi</sup> However, these models generally suggest that additional choice and competition can create incentives for cost containment and performance-enhancing innovation by allowing parents to choose those schools that will be most effective for their child.

Empirical evidence from international achievement tests confirms that students perform

better in countries where more schools are privately operated. For example, students scored 10 test-score points better in TIMSS math, and 9 in TIMSS science, if the share of enrollment in privately managed schools of a country was one international standard deviation (or 14 percentage points) higher (see Woessmann 2003a).<sup>vii</sup> Considering that one grade-level equivalent (the average performance difference between 7th and 8th grade) was roughly equal to 40 points on the TIMSS test, these effects are substantial. For example, students in countries that had a private school sector that was 28 percentage points larger (as measured by the enrollment share) performed better by the equivalent of half a year's learning.

In addition to private enrollment, students in countries with a higher share of public educational spending going to private institutions performed better. If the share of public funds going to independent private schools rose by one percentage point (or one international standard deviation), there was a 10-point increase in math achievement. In sum, student performance seems to be higher in education systems where taxpayers' money is allocated to private schools rather than to the public schooling system alone.

The evidence discussed so far, using TIMSS data, is based on country-wide measures of the extent of private schooling. This does not allow for a direct assessment of the relative performance of public and private schools, because TIMSS does not provide school-level data on whether individual tested schools are public or private. However, measuring the system-level effect of private school operation may be the most appropriate way to estimate the general systemic effect of the competitive environment prevailing in different education systems, because increased competition from private schools may also positively impact on the effectiveness of resource use in nearby public schools.

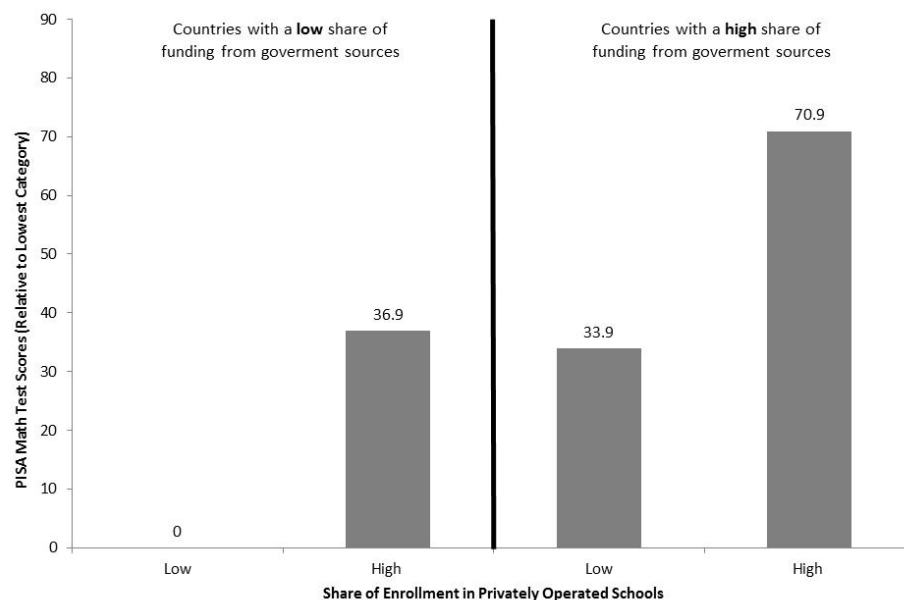
By contrast, the PISA studies provide specific school-level data on public versus private operation and financing. In particular, in PISA there is information for each tested school both on whether the school is privately or publicly operated and on how large its share of public funding is. Public school operation is defined as schools managed directly or indirectly by a public education authority, government agency or governing board appointed by government or elected by public franchise, whereas private school operation is defined as schools managed directly or indirectly by a non-government organization, for example a church, trade union, business, or other private institutions. The share of public funding is defined as the percentage of total school funding coming from government sources (at different levels), as opposed to such private contributions as fees and donations.

Looking across all countries, the result is that students perform better if their specific school is privately operated. The size of the performance difference between privately and publicly operated schools is between 16 and 20 PISA test-score points in the three different subjects in PISA 2000 (Fuchs and Woessmann 2007), and the same result is found in PISA 2003 (Woessmann et al. 2009). This pattern is not uniform across countries, however (Woessmann 2009b). Woessmann et al. (2009) find that students in privately operated schools also score better on certain non-cognitive outcomes, such as reduced disruptive behavior and tardiness. However, one should be cautious when interpreting these results based on micro-level variation within countries, as there may

be self-selection of students with different capabilities into private schools. While many features of self-selection will be held constant by the family-background controls included in each analysis, some self-selection bias due to unobserved heterogeneity of students likely remains.

Woessmann (2009b) and Woessmann et al. (2009) provide a more in-depth analysis of the effects of private versus public operation and financing of schools in PISA 2000 and 2003, respectively, measuring these features mostly at the country level. This approach makes it possible to capture systemic effects where both private and public schools may perform at a higher level because of the existence of private competition. If public schools behave differently because there are private schools nearby, there may be effects of private involvement even though the performance of individual private and public schools does not differ at the level of schools. The results show again that countries with a larger share of privately operated schools perform better. Importantly, however, larger shares of public funding (as opposed to operation) are associated with better student outcomes both in PISA 2000 and in PISA 2003. This pattern is evident in Figure 1, which shows that countries which combine relatively high shares of private operation with relatively high shares of funding from government sources do best among all possible operation-funding combinations. Countries which combine public operation with private funding do worst.

Figure 1: Effects of Private vs. Government School Operation and Funding



Note: Based on cross-country student-level multiple regressions using the PISA 2003 micro database. “Low” and “high” refer to the first and ninth decile on the international distribution of the two variables (0% and 55% in the case of private operation and 55% and 100% in the case of government funding). Source: Woessmann et al. (2009).

Furthermore, the performance advantage of privately operated schools over publicly



operated schools is particularly strong in countries with large shares of public funding (Woessmann 2009b). This suggests that greater public funding may increase the choices available to poor families. Without public funding, poor families may be constrained in their choices because they do not have the financial means to opt for private schooling. In these cases, public funding may help families to exert their choices in terms of privately managed schools, so that the positive effect of public funding may be another aspect of the skill-enhancing capacity of school choice and competition.

Consistent with this reasoning, Woessmann et al. (2009) find that students in countries where public funding is equalized between privately and publicly operated schools perform significantly better than students in countries where privately operated schools receive less government funding than publicly operated schools. In other words, a level financial playing field between public and private schools seems to create an environment of choice and competition that raises student achievement. Woessmann et al. (2009) also show that a larger difference between private and public schools in the share of government funding is detrimental for the equality of educational opportunity: Government funding of private schools benefits students with low socioeconomic status more than students with high socioeconomic status. Taken at face value, then, evidence from cross-country studies based on the TIMSS and PISA suggests that school systems based on public-private partnerships where the state finances schools but contracts their operation out to the private sector are most effective in terms of producing student achievement.

One potential concern with this evidence, however, is that countries with large private school sectors may differ in unobserved ways from the countries with which they are being compared. Countries where more people choose to invest in private education may have other attributes, such as higher income levels or a greater commitment to education, that lead to better achievement. If this is the case, any positive correlation between private schooling and student achievement could reflect a country's income or educational commitment rather than any beneficial effects of competition. Alternatively, it may be the case that low-quality public schools increase the demand for private schooling. If so, then the results just discussed may understate the role of competitive effects.

West and Woessmann (2010) address this concern by taking advantage of the historical fact that the size of the private education sector varies from one country to another for reasons that have little to do with national income, commitment to education, or contemporary school quality. In particular, the extent of private schooling today stems in large part from the Catholic Church's decision in the 19th Century to build an alternative system of education wherever they were unable to control schools operated by the state. Their results, based on 29 developed democracies which participated in PISA 2003, confirm that the share of schools that are privately operated has an economically and statistically significant positive effect on student achievement in mathematics, science, and reading. Importantly, much of the positive effect accrues to students in public schools, suggesting that the overall effect is not simply due to privately operated schools being more effective, but rather reflects beneficial effects of competition. Finally, they also show that more private school competition reduces educational expenditure per student, so that better educational outcomes are obtained at lower cost.<sup>viii</sup>

Even so, there are important caveats to keep in mind when considering policy proposals to expand educational choice. Critics fear that wider choice could increase stratification along lines of ability, ethnicity, or socio-economic status and have adverse consequences for disadvantaged students (e.g., Burgess, McConnell, Propper and Wilson 2007; Cullen, Jacob and Levitt 2005; Ladd 2002). Others argue that a universal voucher system would create considerable administrative costs that are ignored by most analysts (Levin 1998). While much more research is needed before we fully understand the dynamics of competition in education and the conditions which determine its effects, the available evidence suggests that the use of competition from private educational providers, combined with public funding of schools, can increase the efficiency with which students receive necessary competencies.

### *School autonomy*

A characteristic that often distinguishes privately operated schools is greater autonomy in decision making. In the international analyses, the effects of the private versus public operation have been disentangled from effects of differential autonomy of schools. The extent of autonomy that schools have constitutes a separate set of institutional features that depicts the extent to which schools and teachers are free to make their own choices. Economic models contrasting centralized and decentralized school operation suggest that greater autonomy can lead to increased efficiency by allowing schools to draw on local knowledge to respond to family needs.<sup>ix</sup>

The overall pattern of findings from international tests concerning the effects of school autonomy indicates that students perform at significantly higher levels in schools that have more flexibility in process and personnel decisions (Woessmann 2003a; Fuchs and Woessmann 2005, 2007; Woessmann et al. 2009). These decisions include such areas as the purchase of supplies and budget allocations within schools, hiring and rewarding teachers (within a fixed budget), and choosing textbooks and instructional methods. That is, there are positive average effects of allowing both primary and secondary schools more autonomy in these specific decision-making areas.

Hanushek, Link, and Woessmann (2011) have refined our understanding of the effects of autonomy in a recent study that uses all four PISA waves from 2000 to 2009 to exploit variation in average school autonomy within each participating country over time. Their analysis suggests that local autonomy indeed has an important impact on student achievement, but this impact varies systematically across countries, depending on the level of economic and educational development: Countries with otherwise strong institutions gain considerably from decentralized decision-making in their schools, while countries that lack such a strong existing structure may actually be hurt by decentralizing decision-making. The result holds across different decision-making areas but is generally stronger with regard to matters of academic content (curriculum, texts, etc.) and weaker with regard to budgetary decisions. In particular, the negative effect in developing countries is less

pronounced for autonomy in the areas of personnel and budgets and emerges most clearly for autonomy in areas relating to academic content.

Woessmann et al. (2009) also show that there are strong positive interactions between private school operation and the average extent of autonomy that schools have in a country: Privately operated schools perform even better if schools in the system are autonomous in formulating the budget and in staffing decisions. The incentives created by parental choice of private schools thus work particularly well if (private and public) schools in the system have autonomy to respond to parental demands. In such systems, privately operated schools face particularly strong incentives to perform well.

### *Accountability through external exams*

Principal-agent models of educational production predict that setting clear performance standards and providing performance information can tilt incentives in favor of superior student performance (see, e.g., Costrell 1994; Betts 1998). By signaling student performance to potential employers on the labor market, external school-leaving exams increase students' rewards for learning as well as parents' scope for monitoring the education process, which should ultimately improve student performance (see, e.g., Bishop and Woessmann 2004; Bishop 2006). The accountability introduced by external exams can help to face the challenge for the institutional set-up of school systems to create a set of incentives that encourages school personnel to behave in ways that do not necessarily further their own interests, but rather the interest of best student learning. For instance, without the right incentives, teachers may avoid using the most promising teaching techniques, preferring to use the techniques they find most convenient. If a country assesses the performance of students with some sort of external exam and uses this information to monitor teachers, teachers may put aside their other interests and focus mainly on raising student achievement. In sum, testing performance can lead to better-informed choices and make students and educational providers accountable for what they learn and teach.<sup>x</sup>

Evidence from the international student achievement tests is again consistent with this reasoning. Students perform substantially better in countries that have external exit-exam systems than in countries without external exit-exam systems. This is true in TIMSS, TIMSS-Repeat, PISA 2000, and PISA 2003 (see Woessmann 2003a, 2003b, 2005a; Fuchs and Woessmann 2007; Woessmann et al. 2009), as well as in other previous international achievement tests (see also Bishop 1997, 2006). Taken as a whole, the evidence suggests that the effect may well be larger than a full grade-level equivalent.

Similarly, students perform better where parents take interest in teaching matters, suggesting positive effects of parents holding schools and children accountable (Woessmann 2003a). Also, both primary and secondary school students perform

better where teachers use regular tests and exams to monitor student progress (Fuchs and Woessmann 2005, 2007). In addition, students perform better in schools and countries with accountability measures aimed at teachers, such as internal and external monitoring of teacher lessons, and with accountability measures aimed at schools, such as assessments used to compare them to district or national performance (Woessmann et al. 2009).

In the two national education systems where the existence of external exams varies within countries because some regions feature them and others not, Canada and Germany, it has similarly been shown that students perform better in regions with external exams (see Bishop 1997; Jürges, Schneider and Büchel 2005). Woessmann (2010) even shows that the estimated size of the effect of external exit exams does not differ significantly between the sample of German states and the sample of OECD countries. Another means to increase accountability are school-focused accountability systems, which have been shown to increase students' learning achievement in the United States (Hanushek and Raymond 2004; Jacob 2005; Figlio and Loeb 2011).

To be sure, designing proper accountability systems that hold actors accountable for only those outcomes for which they are really responsible is not an easy task. External exit examinations can introduce incentives for students if they produce signals of accomplishment that have real consequences for students. Bishop (2006) suggests that a well-designed system of external exit examinations should be curriculum-based, define achievement relative to an external standard, measure across the full range of student performance, signal multiple levels of accomplishment, and cover the vast majority of students in a given school system.

By contrast, accountability systems that aim to create proper incentives for schools require a value-added approach which tests the learning gains (rather than levels) of individual students (see Kane and Staiger 2002; Ladd and Walsh 2002). School-focused accountability systems can also lead to strategic responses by teachers and schools, for example increased placements of low-performing students in special-education programs outside the accountability system or pre-emptive retaining (non-promotion) of students (Jacob 2005). High-stakes testing may also introduce incentives for cheating (Jacob and Levitt 2003). Thus, in designing and implementing educational accountability systems, efforts must be made to minimize strategic responses and fraud. By contrast, worries about the direct costs of implementing accountability systems should not be overstated, as the costs of the accountability programs implemented in several US states that include comprehensive external testing have been shown to be minuscule relative to overall education spending (Hoxby 2002).

## *The interaction of external exams and school autonomy*

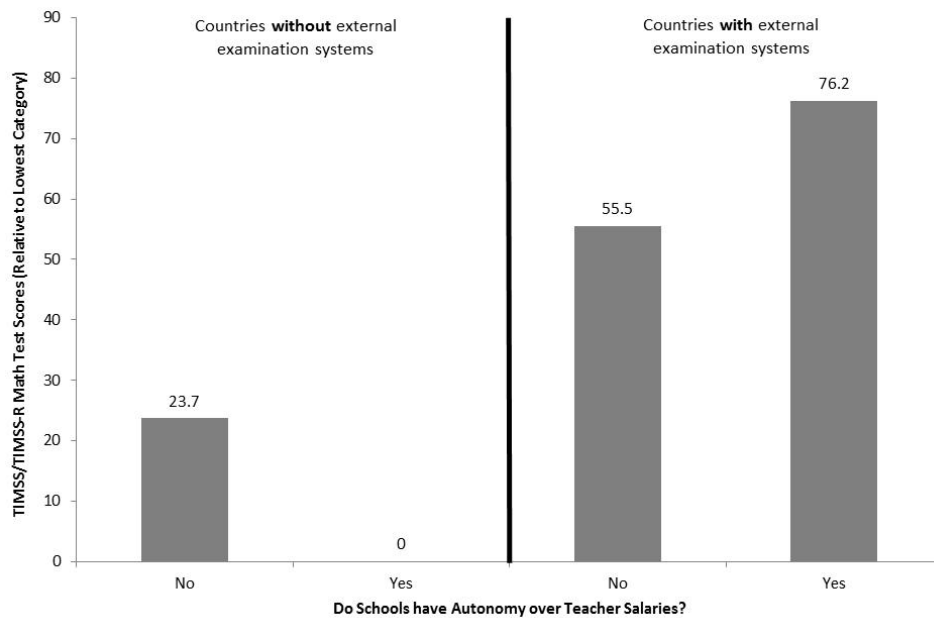
We have thus far treated school autonomy and accountability as unrelated institutional features. However, there is reason to expect that accountability and school autonomy are complementary, in the sense that one is particularly effective if the other is also in place. In particular, external exams and other educational accountability mechanisms may provide a common “currency” with which to value student achievement that enables autonomous schools to function properly in the context of an otherwise decentralized school system (Woessmann 2005a). In the economic system, money is an institutional feature that allows one to compare the value of different objects. This kind of price system creates information that no single individual would be able to gather. In much the same way, external exams can provide such price information to the education system. The important feature is that the exams are administered by entities external to the individual school, so that they provide independent and comparable information on how the school performs. Parents can then use this information created by external exams to make appropriate choices. With this “price system” in place, a system of decentralized, autonomous schools can be expected to work much better than would any centralized system, both because the autonomous schools can use their superior local knowledge about how to best teach their students and because competition provides them incentives to focus their efforts on student learning.

This assertion can be corroborated by evidence from the cross-country pattern of student performance. The results show that external exit exams improve educational performance, and at the same time that school autonomy is more beneficial in systems with external exams (Woessmann 2005a; Fuchs and Woessmann 2007; Woessmann et al. 2009). In several decision-making areas, external exams even turn an initially negative autonomy effect around into a positive effect.

Figure 2, for example, plots students’ math performance in TIMSS and TIMSS-Repeat under the four conditions resulting from the presence and absence of external exams and school autonomy over teacher salaries: the performance of students in schools without salary autonomy in systems without external exams; with autonomy but without external exams; without autonomy but with external exams; and with both autonomy and external exams. Performance is measured relative to the condition with the lowest performance, which is the condition of salary autonomy without external exams.



Figure 2: Complementarity of External Exams and School Autonomy over Salaries



Source: Woessmann (2005a).

This is strong evidence of complementarity between accountability and decentralized choice. Without the accountability introduced by central exams, schools behave opportunistically because their local opportunistic behavior cannot be externally observed and thus cannot be sanctioned. Hence school decision-makers do not feel obliged to set teacher salaries so as to contribute to enhancing student performance, but can use their decision-making autonomy to promote other interests. In contrast, central exams provide information about whether the schools perform well or not, so that parents and supervisory authorities can draw possible consequences from school behavior that weakens performance. This creates incentives for decision-makers in schools not to exploit their autonomy in setting teacher salaries in an opportunistic way, but to use it in order to effectively promote student performance. The benefits of superior local knowledge then come into effect, as school decision-makers ought to know better than any central authority which teachers deserve to be rewarded for good work.

That is, the accountability introduced by the “price information” of external exams creates competition, which brings the beneficial effects of local school choices to the fore. Contrasting effects of school autonomy over teacher salaries in school systems with and without central exams are found not only in TIMSS and TIMSS- Repeat, but also in PISA (Fuchs and Woessmann 2007). Likewise, similar cases where external exams turn a negative autonomy effect around into a positive effect have been found for such decision-making areas as school autonomy in determining course content and teacher influence on resource funding. In their panel analyses of the four PISA

waves, Hanushek, Link, and Woessmann (2011) confirm that the effect of introducing autonomy is more positive in countries that hold the system accountable by central exit exams.

In sum, external exams can be regarded as the “currency” of school systems: They are a measure of value which prevents decentralized opportunism. As such, they are a precondition for decentralized education systems to achieve high student performance. Efficient education policies would thus combine external exams with autonomous and privately operated schools, setting and testing standards externally but leaving it up to schools how to pursue them. Relatively autonomous private schools require external accountability, and parents require the information generated by policies of external accountability in order to make well-informed choices.

## *Summary and conclusion*

This chapter has reviewed international evidence on the effects of educational freedom, conceived broadly to encompass the ability of families to choose privately operated schools, the ability of both private and public schools to make autonomous decisions, and the availability of information that facilitates well-informed and accountable decisions. Studies using student-level data from multiple international achievement tests reveal that institutions ensuring competition, autonomy, and accountability within national school systems are associated with substantially higher levels of student performance.

The institutional effects we have documented, when combined, add up to a very large aggregate impact. For example, when adding the individual effects of these institutional features, their effects in TIMSS sum to more than 200 test-score points, compared to an international standard deviation of 100 test-score points and to a grade-level equivalent of 40 test-score points (Woessmann, 2003a). Similarly, about a quarter of the overall international variation in educational performance in PISA can be accounted for by variation in the institutional features of participating countries (Fuchs and Woessmann, 2007).<sup>xi</sup>

The specific lessons that policymakers can draw from cross-country evidence include that students perform better:

- in countries with more competition from privately operated schools;
- in countries where public funding of privately operated schools ensures that all families can make choices;
- in schools that have freedom to make autonomous process and personnel decisions;
- where external exams holds students and schools accountable; and

- where private operation, school autonomy and external exams are combined.

Evidence based on international comparisons across numerous countries allows policymakers in all countries to learn from each other as they attempt to discern what will work best in their own education system. At the same time, although it allows us to discern broad policy lessons, it has less to say about the design of specific reforms and the details of their implementation in particular contexts. Surely, implementation is crucial with any of the institutional features discussed, and more nuanced research is needed to learn how to implement choice, autonomy, and accountability in different circumstances.

It is also worth emphasizing that choice, autonomy, and accountability are not the only relevant institutional features of education systems. For example, Woessmann (2011) finds that teacher salary adjustments for outstanding performance are positively related to student outcomes across countries in PISA 2003. Similar positive effects of performance-related pay have been shown in Israel (Lavy 2002, 2009) and England (Atkinson et al. 2009).<sup>xii</sup> Teacher incentives are particularly crucial because arguably, apart from the students themselves, teachers constitute the most important “input” in the education process, in terms of both cost and content (see Rivkin, Hanushek, and Kain 2005). Another institutional feature with possibly important implications for educational performance is the extent of tracking of students into different types of school, which has been shown to be associated with increased inequality of student achievement across countries (Hanushek and Woessmann 2006). Likewise, the extent of the pre-school education system can have a large impact on students’ later learning achievement (Schuetz et al. 2008; Schuetz 2009). Thus, interventions at early ages may be particularly relevant, given the importance of early childhood investments for later educational investments over the life cycle (Cunha, Heckman, Lochner, and Masterov 2006).

When considering how education policies can create the educational achievements required for citizens and societies to prosper in the future, institutional reform appears to be a more binding constraint than lack of resources. For educational investments to translate into student learning, those involved in the education process must face incentives that encourage them to act in ways that advance student performance. In our view, the international evidence suggests that policies that allow parents to choose privately operated schools, give schools autonomy, and provide parents with information on student performance have an important role to play in achieving this vision. Not only would they expand freedom, but they also stand a good chance of improving students’ educational achievement.

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## *Endnotes*

<sup>1</sup> By contrast, all studies on international educational performance find strong effects of family background on educational performance, with students from better-educated homes with a higher socioeconomic status performing substantially better (see, e.g., Woessmann, 2003a; Schuetz et al. 2008; Hanushek and Woessmann 2011). Unfortunately, these aspects of family background are generally less susceptible to policy intervention.

<sup>2</sup> Exceptions are Canada and Germany, where central exams are a regional feature.

<sup>3</sup> See Bishop and Woessmann (2004) for a more elaborate theoretical model of institutional effects in education.

<sup>4</sup> For methodological details of the econometric techniques, see Woessmann (2003a, 2003b) and Fuchs and Woessmann (2007).

<sup>5</sup> The results are only briefly summarized here. For considerably more detail, see Woessmann (2002, 2003a) for the results using TIMSS data, Woessmann (2003b) for TIMSS-Repeat, Fuchs and Woessmann (2007) and Woessmann (2009b) for PISA 2000, Woessmann (2005a) for all three, Woessmann et al. (2009) for PISA 2003 and Fuchs and Woessmann (2005) for PIRLS

<sup>6</sup> See, e.g., Chubb and Moe (1990), Shleifer (1998), Epple and Romano (1998), Nechyba (2000) and Gradstein, Justman and Meier (2004).

<sup>7</sup> These results refer to the OECD countries participating in TIMSS, for whom consistent data on the share of private schools are available.

<sup>8</sup> Using the same research design and data from the 2006 administration of PISA, Falck and Woessmann (2012) find that private-school competition not only positively affects cognitive test outcomes, but also students' intentions to become an entrepreneur later in life

<sup>9</sup> See, e.g., Hoxby (1999), Nechyba (2003), and Bishop and Woessmann (2004).

<sup>10</sup> Peterson and West (2003) provide a collection of work on accountability

<sup>11</sup> The main part of the remaining international performance variation can be attributed to international variation in average student and family background.

<sup>12</sup> Atkinson et al. (2009) provide a survey of additional studies on performance-related teacher pay, the more rigorous of which also tend to find a positive relationship between financial teacher incentives and student outcomes.

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